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p. 48, 1878), where the number is given as 28. My material was macerated and then examined with the microscope, and the count verified repeatedly on different specimens.

The colors of the Carolina fishes are the same as those of Illinois examples. The markings which at once catch the eye are a dusky bar below the eye and eleven narrow vertical bars on the side, two of those immediately behind the gill opening being enlarged to form a dusky spot. Three dusky dots at the bases of the caudal rays appear to be a constant character of young fishes.—H. GARMAN, Lexington, Ky.

The Human Tail.—According to Prof. W. Waldeyer,[5] who has recently gone over the subject, a tail is to be defined as a portion of the body that contains the caudal, *i. e.*, post-sacral, vertebræ and sundry other derivatives of caudal segments, all surrounded by integument. With reference to man, Virchow, in 1880, distinguished between tails with vertebræ and soft tails—a distinction generally recognized. As is well known the human embryo always shows evidence of a true vertebrated tail that may even persist after birth, yet in no case is it certain that more vertebral elements are present than are to be found in the normal coccyx. What occurs in tailed human subjects is the soft tail of Virchow, which corresponds to the distal non-vertebrated portion of the tail in other animals. In some cases this may be partly bony, but there is no increase in the number of caudal vertebræ.

ENTOMOLOGY.[1]

The Fauna of the Lower Rio Grande Valley.—Mr. H. F. Wickham publishes[2] an interesting paper on The Coleoptera of the Lower Rio Grande Valley, in which he discusses the faunal relations of the region as follows:

Regarding the true affinities of the Coleopterous fauna and the claim of the region to be considered tropical in its nature, opinions are more or less divided. Mr. Schwarz has stated that "no one can doubt the existence of a semi-tropical insect fauna along the north bank of the lower Rio Grande." Prof. Townsend classes the Brownsville fauna as Lower Sonoran, with a considerable touch of Austroriparian and about twenty-five per cent. tropical. Dr. Merriam has included it in his tropical region. Dr. LeConte, writing thirty-seven years ago, speaks of it as a "sub-tropical province."

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[5] S. B. K. Preuss. Akad. Wiss., 1896, 775–84. J. R. M. S., 1896, p. 601.

[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

[2] Bull. Lab. Nat. Hist., Univ. Iowa, IV, 96–115.

Looking through the list of species belonging to the five families treated in the present portion of this report, it seems to the writer that no one familiar with the Coleopterous fauna of the United States can pick out more than five or six which can be called characteristic of the Lower Sonoran zone, though it is true that quite a number range into it. A number—perhaps fifteen or sixteen—are tolerably characteristic of the Upper Sonoran, while possibly twelve or fourteen are more particularly tropical. The great majority are species of very wide distribution in eastern and central North America, many of them extending even to the Canadian boundary. No doubt can be entertained, however, that a study of the phytophagous families will yield a larger percentage of Sonoran and tropical species, since we may naturally infer that the carnivorous beetles, of which the present list is mainly composed, are less affected by peculiarities in the flora than the phytophaga.

More will be said on the subject in the concluding number of this article. For the present it will be sufficient to state the conviction that there is even less ground for considering the Brownsville beetle-faunas as Lower Sonoran than for classing it as tropical. The little jungles noted by Mr. Schwarz are to be considered, it seems, almost truly tropical, while, on the other hand, there are large areas of a very different nature surrounding these little forests, with a totally different Coleopterous contingent. Some of these areas are, from their elevated situation and dry climate, almost typically arid Lower Sonoran, while the low-lying damp spots, not tropical, will show a high percentage of forms common in humid regions occupied by what Dr. Merriam has called the Carolinian and Austroriparian faunas. In other words. Brownsville and its environs are not in one life zone, but in at least two, and probably three, the limits of these zones being locally irregular, and determined not by temperature conditions, but by those of soil and humidity, which, through their action on plant life, also influence the insects. The only way in which these conditions could be approximately indicated on a map, would be by spotting it with appropriate colors as in mapping Boreal or Arctic faunæ on isolated mountain peaks.

Life-history of Xylina.—In Bulletin 123 of the Cornell University Experiment Station, Mr. M. V. Slingerland discusses at length the life-history of three species of Xylina—*antennata, laticinerea, grotei* —which have done considerable damage by eating holes in young apples. "The green fruit worms," he writes, "do most of their damage to the young fruits in May, but some of them continue working until nearly the middle of June. During the first week in June most of the caterpillars get their full growth and then burrow into the soil beneath the trees to a depth of from an inch to three inches. Here they roll and twist their bodies about until a smooth earthen cell is formed. Most of them then spin about themselves a very thin silken cocoon; some spin no cocoon. Within the cocoon or the earthen cell the caterpillar soon undergoes a wonderful transformation which results in what is known as the *pupa* of the insect. Most of these insects spend about three months of their life in the ground during the summer in this pupal stage. Some evidently hibernate as pupæ, and thus pass nine months or more of their life in this stage. Usually, about September 15th, the moths break their pupal shrouds and work their way to the surface of the soil. Most of them emerge in the fall before October 15th, and pass the winter as moths in sheltered nooks; some evidently do not emerge until spring. Warm spells in winter sometimes arouses a few of them from their hibernation.

"During the first warm days of early spring all the moths appear, and doubtless the mothers soon begin laying eggs. No observations have been made on the eggs or young caterpillars in the north, but in a newspaper article published in the south in 1872, it is stated that the eggs are deposited in the spring on the undersides of the leaves. They hatch in a few days, and the young worms begin at once to eat the foliage, or the fruit, or both.

"There is thus but one brood of these green fruit worms in a year. They work mostly in May, pupate in the soil in June, live as pupæ during the summer and sometimes all winter, and most of the moths emerge in the fall and hibernate, laying their eggs in the spring."

Notes on Dragon-flies.—Prof. D. S. Kellicott publishes[3] some interesting data regarding the occurrence of Odonata in Ohio during 1895 and 1896. "In 1895," he writes, "I prepared and published a chart showing what was then known about the distribution and time of flight of each of the eighty-six species of Odonata known to inhabit Ohio. It was believed the record, so far as it went, was reliable. Some species had been found only in limited areas and at definite times in the year. The schedule showed what species occurred in early, mid and late summer, and in northern, central or southern Ohio. But with the opening and progress of the present season, my confidence in the chart referred to has been severely tested. How did it happen? We naturally turn to the climate and its vicissitudes for the explanation of many things—trivial and grave. Will it help us in the matter in hand?

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[3] The Agricultural Student, III, 141.

"The seasons of 1894 and 1895 were very dry throughout the State. Streams and ponds lost all their water and the mud at the bottom was dry and parched for months over large areas. Streams of considerable volume in ordinary years disappeared entirely for weeks or there remained only restricted pools here and there. The winter of 1895–6 was constant for Ohio with less than the average snowfall. The weather remained cold until April 10th, when it suddenly became very warm and remained so with abundant rain. What resulted as to the appearance or non-appearance of dragon-flies? The following notes will state some of the observed facts:—

First—Many species occurred unusually early. The largest number recorded in April at Columbus in any previous year was five; this year it was ten. They were taken in the following order: *Anax junius*, April 13th; *Ischnura verticolis*, April 15th; *Didymops transversa*, *Basiaeschna janata*, *Anomolagrion hastatum*, *Lestes forcipata*, *Tramea carolina*, *Plathemis trimaculata*, *Libellula semifasciata* and *Nehalennia posita*. The variety is not less interesting than the number. Among them are some of our largest species and the smallest; while four families are represented. Five have been taken in April in previous years, although not in the same year. Anax, Ischnura, Didymops, Basiaeschna and Tramea have been taken as early in former years, the first two much earlier, but the remaining forms not until May was well advanced or until midsummer. From this a general statement may be made that five of the ten earliest species appeared no earlier than usual, but appeared suddenly, i. e., after a very few warm days, while five appeared from two to four weeks early than ever before noticed. I may extend this record of early occurrence by saying that thirty-five species were taken before the end of May, and that several of them were those not before seen on the wing until midsummer.

"In this connection let me say that species common to Ohio and the Atlantic coast appear to emerge fully two weeks earlier in the interior than on the coast at the same latitude. Nor is it a matter of isotherms alone, as a glance at an isothermal map and the recorded captures at Philadelphia and New York will show. It is, I suspect, due rather to distribution of heat and affects only early appearing species.

"Second—It is an interesting question, one often asked, but not answered, whether the existing species are fewer than when the country was more primitive. The diminution of streams, ponds and morasses, as well as the pollution of streams, have been taken to be sufficient causes for their reduction. The unusual conditions for 1894 and '95 naturally lead us to inquire if any light has been shed on the question. What, then, have been the observed results? So far as my observations have gone, and I have been much in the field, there is no evidence in the line expected. Odonata in the region included in these notes have been unusually abundant during the summer of 1896. No species hitherto taken in any abundance has been missed, while several not before taken at all have been abundant. This was unlooked for. Possibly my records indicate this, that the usual abundance in early spring and summer was in the vicinity of perennial waters, and that about the transient ones they were fewer than the normal number; it is certain that all of the six or seven additional species taken were found in the vicinity of such streams and ponds.

"The consideration of the foregoing facts and the conditions which seem to have influenced them leads to a possible clue to the causes. Life of all kinds, plant and animal, in the restricted and concentrated waters of the dry seasons, were excessively abundant. The predacious odonate larvae, so long as any moisture remained, would be in clover; but when the water entirely disappeared, what?

"Unfortunately, there are no records at hand in regard to ability to remain in the mud or within capsules of earth at the bottom of dried-up ponds. Other animals and some large larvae are known to do so. Why not also the larvae of Odonata? If this fact was proven it would easily explain the unusual abundance of dragon-flies this present season in place of an anticipated dearth. Again, the eggs of some species, certain species of Diplax for example, do not hatch immediately, and therefore, may remain in the dust or mud until the autumn rains or until spring. In this connection I may state that *Diplax rubicundula* and *D. obtrusa* have been seen industriously ovipositing among the grass and weeds overgrowing dry ponds and ditches. Eggs thus scattered would certainly have to remain without immersion among dust and rubbish, in some instances, for weeks. The female of *Lestes rectangularis* has been seen ovipositing in stems of Scirpus and Sparganium where no water remained in the marsh and surely did not return for a month. It would appear from these incomplete observations that the nymphs of Odonata may and probably do readily pass the trying times of drouth unharmed.

"Third—Records made this summer have confirmed conclusions of former years that southern forms extend their range on the western border of Ohio to Lake Erie. I may cite, as example, *Dromogomphus spoliatus*, which, until taken by me at Toledo, was recorded only from the extreme south. I do not remember to have seen it in any private or public collections. This year, along the Maumee River, it was exceedingly abundant."

Changes of Intestinal Epithelium in Tenebrio.—Herr C. Rengel has studied the changes of the intestinal epithelium in the metamorphosis of the Mealworm (*Tenebrio molitor*) and compared them with those occurring elsewhere. Regenerative cells, from which the new epithelium is derived, appear as subepithelial islands in very young larvæ, but it is only when the metamorphosis begins that they give rise to the elements which form the invaginal epithelium. As in Muscidæ the disruptions begin with an energetic contraction of the muscular layer, and the old mid-gut epithelium is raised off. Its disintegrating cells are held together in a "cyst" by their membranea propria, and form the "yellow body." The muscles undergo gradual disruption without active invasion by phagocytes as occurs in Muscidæ. Korotneff compared the two modes to chronic and acute pathological processes. As soon as the larval muscular layer had been disrupted, nuclei are seen surrounding the epithelial cylinder. Whether these nuclei are old or new elements is doubtful, but the small cells of which they form the centers become the fibrils. Rengel's opinion is that many muscle-cells survive the general revolution, just as a large number of epithelial regeneration cells persist. The latter give origin to the epithelial cylinder, the former to the mnscular layer. (Journ. Royal Micros. Soc.)

PSYCHOLOGY.[1]

Dreams.—At the Psychological Congress last year, Dr. J. Mourly Vold, of Christiania, reported some experiments which he had undertaken with regard to the artificial stimulation of visual elements in dreams. The subjects included a large number of persons of different ages, sexes and classes, but were mostly adults of an intellectual type above the average; all those selected were good dreamers. Dr. Vold arranged the experiments as follows: To each of his subjects he sent, from time to time, a package containing figures of animals, well-known objects, etc., cut out of white paper, or some striking colored object—

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[1] Edited by H. C. Warren, Princeton University, Princeton, N. J.